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# USSR Report

SCIENCE AND TECHNOLOGY POLICY

(FOUO 2/82)



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38TH SESSION OF COUNCIL ON COORDINATION OF SCIENTIFIC ACTIVITY HELD

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 81 p 16

[Introduction to report: "The 38th Session of the Council for the Coordination of the Scientific Activities of the Union-Republic Academies of Sciences, Tashkent"]

[Text] The regular 38th session of the Council for the Coordination of the Scientific Activities of the Union-Republic Academies of Sciences, under the presidium of the USSR Academy of Sciences, took place 12 to 14 May 1981 in Tashkent. In its work there was participation by the president of the USSR Academy of Sciences, Academician A. P. Aleksandrov; vice-presidents of the USSR Academy of Sciences, Academicians V. A. Kotel'nikov and P. N. Fedoseyev; members of the USSR Academy of Sciences, presidium, Academicians N. G. Basov, S. V. Vonsovskiy, I. A. Glebov, B. Ye. Paton, A. S. Sadykov, and A. A. Trofimuk; other important scientists and officials of the union-republic academies of sciences, affiliates and scientific centers of the USSR Academy of Sciences; and responsible workers of the CPSU Central Committee, the Uzbekistan Communist Party Central Committee and republic Council of Ministers, and of the USSR State Committee for Science and Technology and other agencies.

In opening the session, the chairman of the Coordination Council, President of the USSR Academy of Sciences, Academician A. P. Aleksandrov, gave the floor to Candidate-Member of the CPSU Central Committee Politburo and First Secretary of the Uzbekistan Communist Party Central Committee, Sh. R. Rashidov, who, in the name of the Uzbekistan Communist Party Central Committee, the republic presidium of the Supreme Soviet and Council of Ministers, warmly greeted the participants of the session and wished them success in their work.

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ACADEMICIAN ALEKSANDROV SPEECH TO THE COUNCIL

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 81 pp 16-18

[Summary of opening remarks by A. P. Aleksandrov, president of the USSR Academy of Sciences, at the 38th Session of the Council for the Coordination of the Scientific Activities of the Union-Republic Academies of Sciences: "Opening Remarks by President of the USSR Academy of Sciences, Academician A. P. Aleksandrov"]

[Text] In his opening remarks, A. P. Aleksandrov characterized the status of scientific research coordination in the country's academy institutions and higher educational institutions. Considerable improvement in the coordination of research during the last ten years has made possible a wider exchange of experience and the achievement and practical implementation of important scientific results but, at the same time, there are still defects and unsolved problems. A. P. Aleksandrov gave special attention to the Summary Report of the CPSU Central Committee to the 26th CPSU Congress, in which Comrade L. I. Brezhnev, having rated highly the role of science in the life of our country and, particularly, the achievements of the USSR Academy of Sciences and union-republic academies of sciences, noted at the same time that among scientific institutions there are still ineffective institutes and laboratories which, over long periods of time, have not brought about any noticeable results. It is necessary, said the president, to be more exacting toward the work of the scientific institutions of the USSR Academy of Sciences and of the union-republic academies of sciences and to take measures to increase their effectiveness.

A. P. Aleksandrov dealt with the contributions of individual republic academies of sciences and affiliates of the USSR Academy of Sciences to the development of science in the country which, according to his evaluation, has increased significantly in recent years. He especially noted the significant achievements of the Ukrainian SSR Academy of Sciences, which is the head organization for a number of scientific areas, above all in the development of various types of welding and electrometallurgy. The Belorussian SSR Academy of Sciences, together with the VUZ's of the republic, are conducting successful work in the application of powder metallurgy. The application of powder metallurgy in machine building and tractor and motor vehicle manufacture provides for both savings in metal and increases in machine longevity. A large contribution to the development of permanent magnets with large magnetic energy (up to 30 million G·Oe) was made by the Ural Scientific Center for the USSR Academy of Sciences. These works are helping to accomplish many of the difficult tasks of modern technology, particularly in the electronics industry and even in the

textile industry. Scientists of the center have found a way of making special items from tungsten that are necessary for work in thermonuclear energy, and they have also solved the problem of producing powerful cathodes and a large number of devices for the electronics industry. Scientists of the Uzbek SSR Academy of Sciences are successfully fulfilling important scientific developments related to the practical utilization of wastes from the cotton industry. As a result of their achievements, the possibility has opened up to set up production for a number of products that we still acquire from abroad. In cooperation with the Siberian Department of the USSR Academy of Sciences, the Uzbek SSR Academy of Sciences has done important work on the production of organic compounds tagged with radioactive phosphorus that are widely applied in medical, biological, and many other kinds of research. Thus, now we are able to achieve these substances at a quality level higher than those being produced abroad.

Further, A. P. Aleksandrov touched on the question of relations between academy and VUZ science, on the one hand, and industry, on the other hand. He illustrated the usefulness and effectiveness of such relations with specific examples. Thus, according to joint complex plans with industrial organizations, hundreds of scientific developments have been brought about and, when necessary, joint laboratories have been especially created. This helps ease the introduction of finished scientific developments into industry, eliminating many interagency barriers.

The president dealt with the development of automation for scientific research in institutions of the USSR Academy of Sciences and republic academies. The convenient international standard was taken as the basis for automation. Equipment being manufactured on this standard for tying measuring instruments to computer technology permits building a unified system on the basis of any domestic or foreign computers.

The USSR Ministry of Instrument Making in recent years has been manufacturing measuring-calculating complexes (IVK), which include SM-3 and SM-4 computers. These complexes already are becoming numerous. In the current five-year plan it is proposed to produce 1000 such complexes, which will permit substantial progress in automating our research and increase its rate. In addition to these complexes, the Ministry of the Electronics Industry has developed the "Elektronika-60" machines. The latest modifications have already appeared, and they combine well with the IVK. The Institute of Radio Engineering and Electronics of the USSR Academy of Sciences has developed technology for coupling them together and the necessary interface equipment. Because of this, we now have gone from the lowest level laboratory computer technology that could be tied directly to measuring instruments to the level of the advanced laboratories of the world. The president also noted the development and manufacture of the "Iskra-226" machines, one of the configurations of which is very convenient for automation of experiments because, unlike the SM-3 and SM-4 machines, it does not require extended training on the part of the user. Already in the next five-year plan, noted A. P. Aleksandrov, computer technology will cease to be a bottleneck in the development of our science. Instrument making still lags somewhat and, to meet the needs of academy scientific institutions, it is necessary to continue to expand instrument-making capabilities not only in the USSR Academy of Sciences, but also in the republic academies. The president, with great satisfaction, noted that the development of scientific instrument making is also being planned in Uzbekistan.

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In conclusion, A. P. Aleksandrov expressed gratitude to the Uzbekistan Communist Party Central Committee, the Uzbek SSR Council of Ministers, and the Uzbek SSR Academy of Sciences for offering the opportunity to conduct the visiting 38th session of the Coordination Council in Tashkent and for creating outstanding conditions for the session's work.

Participants of the session heard and discussed reports by Academician V. A. Kotel'nikov, vice-president of the USSR Academy of Sciences, on improving the coordination of activities of the union-republic academies; Academician A. S. Sadykov, president of the UzSSR Academy of Sciences, on experience in joint research among the academies of sciences of Central Asia and Kazakhstan on important regional problems; and Academician A. A. Logunov, vice president of the USSR Academy of Sciences, on strengthening cooperation between the USSR Academy of Sciences and union-republic academies of sciences, on the one hand, and higher schools, on the other. For each report, a corresponding decision was made.

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CLOSER COORDINATION OF SCIENTIFIC INSTITUTES URGED

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 81 pp 19-25

[Report by Academician V. A. Kotel'nikov, vice-president of the USSR Academy of Sciences, to the 38th session of the Council for the Coordination of the Research Activities of the Union-Republic Academies of Sciences: "On Improving the Coordination of the Activities of Scientific Institutions in the Union Republics and the Tasks of the Republic Academies of Sciences in Utilizing Scientific Achievements More Effectively in Fulfilling the Decisions of the 26th CPSU Congress"]

[Text] The 26th CPSU Congress has again pointed out that, without the development of science, it is not possible to build the new society. The congress gave attention to the necessity to improve the organization of scientific research and to accelerate the realization of scientific research results in the country's economy. In the Summary Report to the congress, which was presented by the General Secretary of the CPSU Central Committee, L. I. Brezhnev, it was also stated that "science should be the 'disturber of tranquility,' indicating the sectors where stagnation and backwardness have been noted and where the current level of knowledge provides the possibility to move ahead more rapidly and more successfully."

In recent years, in the USSR Academy of Sciences and in the union-republic academies, a large amount of experience has been accumulated in providing aid in the management of the economy on a country-wide and republic scale, and also, in individual economic regions, in creating work forms that facilitate and accelerate the utilization of scientific results in practice.

However, far from everything has been done in this field.

The purpose of the present report is to generalize existing experience and thereby aid its dissemination.

One of the advantages of our socialist system is the possibility for uniting the efforts of various scientific, design, project-planning, and production organizations, independently of agency subordination, to accomplish tasks that are important for the country or for regions under the management of party and Soviet bodies. This form of work has been widely used in recent years.

To maintain constant creative relationships between scientific and production organizations in the union republics, republic councils for the coordination of scienti-



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fic activities have been created; as a rule, these councils are headed by presidents of union-republic academies of sciences.

Purposeful and systematic work by the republic coordination councils with ministries and agencies, ministerial scientific-research institutes, and VUZ's has led to the improvement of inter- and intra-agency coordination of scientific research and to increase in the share of complex research in fulfilling plans for the most important projects.

Thus, the coordination council under the presidium of the Georgian SSR Academy of Sciences has done significant work on the analysis of the republic's current position in various fields of science and technology and has searched for more effective ways to solve important economic problems (the autoclave-hydrometallurgical processing of Madneuli copper and low-grade Chiatura manganese ores, further agricultural development, and others).

The coordination council of the Latvian SSR Academy of Sciences works in close contact with institutes and industrial organizations of ministries and agencies of country-wide and republic subordination in adjusting the subject matter and in searching for more active forms for utilizing scientists' recommendations in practice. Especially successful are the developing relationships with the USSR Ministry of the Medical Industry, the USSR Ministry of the Chemical Industry, and the republic Ministry of Health in the creation and introduction into practice of effective new preparations and equipment for medical treatment.

Created in 1977, the coordination council under the Moldavian SSR Academy of Sciences has increased the organizational and coordination role of the Academy of Sciences in conducting broad research in the agrarian-industrial and food complexes and, for these purposes, has united the efforts of all scientific institutions of the Academy of Sciences, the scientific-research design organizations of the republic Ministry of Agriculture, VUZ's, and other scientific institutions.

The coordination council under the Estonian SSR Academy of Sciences has done much work on the solution of the problem "The Fuel-Energy Complex of the Estonian SSR," and has also done methodological work with VUZ's and ministerial scientific-research institutes in planning scientific-research projects. As already noted many times, a large amount of experience has been accumulated by the academies of sciences of the Ukraine, Belorussia, and Kazakhstan, and by the Ural Scientific Center of the USSR Academy of Sciences.

The Experience of Visiting-Sessions of Departments of the USSR Academy of Sciences and of Departments of Union-Republic Academies of Sciences

An important role in coordinating scientific-research work and in raising the level of research planning can be played by visiting-sessions of presidium sections of the USSR Academy of Sciences and departments of the USSR Academy of Sciences and union-republic academies with participation by scientific and production organizations.

For example, in the work of sessions conducted by the Department of General and Technical Chemistry in 1976, in Baku, and 1980, in Tbilisi, besides officials of the departments of chemical sciences of all the republic academies, there was parti-

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pation by scientists and production specialists from the Ministry of the Chemical Industry, the Ministry of the Petroleum Refining and Petrochemical Industry, the Ministry of the Pulp and Paper Industry, and the Ministry of Fertilizers.

As a result of this coordination work, in 1976 a new form was proposed for conducting joint projects by academy and production organizations according to commission-orders, and in 1980 an assessment was conducted of these projects for more accelerated utilization of them in practical activities.

There are similar examples among the republic academies of sciences. Thus, the Department of Biological Sciences of the UzSSR Academy of Sciences conducted a visiting-meeting at Andizhan on the cotton problem; the Department of Chemical Sciences of the KaSSR Academy of Sciences conducted one at Karaganda on the development of research in the fields of metallurgy and carbon chemistry; and the ESSR Academy of Sciences conducted one at Kohtla-Jarve on the problem of the complex utilization of shale and other items.

Expanded visiting-sessions of the Section for Social Sciences of the presidium of the USSR Academy of Sciences are held systematically at union-republic academies of sciences where, with participation by broad scientific communities of republics and regions and by representatives of party bodies, there are discussions of urgent questions in the development and directions of research in history, philosophy, and other sciences.

#### Special-Purpose Programs

The conduct of fundamental and applied research under special-purpose programs has important significance, as these programs reflect the urgent requirements of production for more progressive types of products and for complex automation of production processes in industry, agriculture, construction, and transportation.

A substantial feature of the cited programs is the presence of the introduction stage as an obligatory element, and this makes them an effective instrument for accelerating the practical utilization of recent scientific and technical achievements.

Projects according to complex programs are widely represented in the academies of sciences of the UkSSR, UzSSR, BSSR, LaSSR, KaSSR, and in other academies.

Thus, the Academy of Sciences of the Ukrainian SSR is conducting research according to 16 complex plans with ministries and agencies, and also according to 20 complex programs of interest to large scientific-production associations and enterprises of the country. The accomplishment of scientific and applied research according to complex plans and programs has permitted the UkSSR Academy of Sciences to create, for example, more than 300 new technologies of various levels, which are being successfully utilized by enterprises of the Ministry of Ferrous Metallurgy, the Ministry of the Chemical Industry, the Ministry of the Shipbuilding Industry, and other ministries.

The Academy of Sciences of the Moldavian SSR is conducting research according to 15 republic complex scientific-technical problems, which cover questions relating to the intensification of agricultural production and to improving the management

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of economic and social processes. In their implementation there is participation by all institutions of the academy, eight VUZ's and about 50 ministerial scientific-research institutes and scientific-production associations.

The Academy of Sciences of the Latvian SSR has developed scientific-technical problems according to 23 programs and the Academy of Sciences of the Turkmen SSR, according to 11; the Academy of Sciences of the Uzbek SSR is participating in the development of 23 country-wide programs, including such programs as "Cotton."

Among nine programs being conducted by the Academy of Sciences of the Estonian SSR, important research is being done on the problems "Complex Utilization of Shale" and "Complex Utilization of Phosphorites."

The Ural Scientific Center of the USSR Academy of Sciences, together with organizations of the USSR Ministry of Geology, the RSFSR Ministry of Geology, and the Ministry of Ferrous Metallurgy, has successfully conducted research on complex programs such as "The Mineral Wealth of the Urals" and "Ferrous Metallurgy of the Urals" -- 28 in all.

The Kola, Komi, and Karelian Affiliates of the USSR Academy of Sciences have united their efforts in a unified program "The Economic and Social Development of the European Part of the USSR North."

It should be noted that the academies of sciences of the UkSSR, the BSSR, the UzSSR, and the Siberian Department and the Ural Scientific Center of the USSR Academy of Sciences have prepared important material on the Complex Program for Scientific-Technical Progress and Its Social-Economic Consequences up to the Year 2000."

#### Joint Laboratories

One of the forms for uniting the efforts of academy organizations and production organizations of the economic sectors is the creation of joint laboratories. These units, as a rule, are created either at academy institutes or at enterprises of corresponding union or republic ministries. They are financed by the ministry, and scientific and methodological management is accomplished by an academy institute.

Thus, in the Ukrainian Academy of Sciences at the present time there are about 40 such laboratories of 20 all-union or republic ministries, and over 10 of them in the Belorussian Academy of Sciences. In the Latvian Academy of Sciences, 10 of them have been organized; in the Moldavian Academy of Sciences, 11; and in the Kazakh Academy of Sciences, 6. Interagency laboratories operate successfully in the Azerbaijan Academy of Sciences. An undoubted value of such laboratories is the substantial shortening of time from the end of scientific developments to the introduction of their results into the economy. In addition, this form presents more effective mutual enrichment through the ideas and proposals of scientists and production specialists.

Unfortunately, it must be noted that experience in the organization of economic-sector-oriented laboratories and interagency laboratories has still not been sufficiently disseminated among the academies of sciences of Georgia, Armenia,

Tajikistan, and Turkmenia, although these academies are experiencing serious difficulties in implementing their scientific developments because of their weak experimental-production base.

#### Production Bases and Experimental Plants

In the USSR Academy of Sciences during the last five years, a significant amount of work has been done in creating the supply and equipment base to provide for carrying scientific developments forward to meet the needs of production.

Without referring to the UkSSR Academy of Sciences, where such a base has been especially developed, I would like to talk about other academies of sciences.

The BSSR Academy of Sciences has a successfully functioning Central Design Bureau with an experimental shop and seven branches in physical-engineering institutes of the academy. The volume of products produced by these organizations was about 75 million rubles.

The LaSSR Academy of Sciences has created seven scientific-technical complexes based at leading institutes and including the institute, a special design bureau, and an experimental plant. The yearly volume of product output at academy scientific-technical complexes exceeds 17 million rubles (some of the products are even exported to developed capitalist countries -- the United States, Japan, FRG, and certain others.

Experimental production has been well developed at the UzSSR Academy of Sciences, where five scientific-production complexes are now operating.

The experimental-production bases at the academies of Azerbaijan, Lithuania, Estonia, and Moldavia are being expanded successfully.

Considering the lack of funds allotted to academy organizations for capital construction and also the slow rates of implementing plans for creating their own experimental bases, the utilization of enterprise production bases has important significance; it facilitates experimental-industrial verification of research results and introduction into the respective sectors. Attention should be given to the experience of the Ukraine, Belorussia, Kazakhstan, and Moldavia, where decisions by the republic councils of ministers have determined the base production organizations which, together with academy and ministerial scientific-research institutes, provide for the conduct of necessary tests and make available for this purpose their own experimental-industrial facilities, experimental shops, agricultural plots, and so forth.

Thus, for example, in Belorussia there are about 40 such base enterprises; in Moldavia, over 30; and so forth.

#### Contract Subjects

Contracts are one of the important means for enlisting funds from production organizations for strengthening the supply and equipment base of academies of

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sciences and also more rapidly utilizing the results of completed scientific developments in the economy.

The most active in conducting research under contracts with ministries and agencies are the institutions of the UkSSR Academy of Sciences, where receipts from contract subjects is about 50 percent of the total appropriations for scientific research; the BSSR Academy of Sciences (over 52%); and the LiSSR and MSSR Academies of Sciences (over 30%).

At the same time, a number of academies make little use of this financing source. Thus, in the academies of sciences of Georgia, Armenia, Kirghizia, and Turkmenia, the share of contract topics does not exceed 15 to 20 percent.

Moreover, individual academies (for example, the GSSR Academy of Sciences) conclude many small contracts of about 2000 rubles each, which is evidence of lack of significance of these projects.

A circumstance that calls attention to itself is that the experience of joint work between institutes of the USSR Academy of Sciences and ministries confirms the possibility of receiving a substantial supplement to the wage fund from ministries every year -- about 2 million rubles.

#### The Creation of Centers for Collective Use of Expensive and Unique Equipment

Expenditures for equipment and scientific instruments at the present time have been seriously growing. In addition, there have appeared unique instruments, the acquisition and operation of which are beyond the capabilities of individual institutions. At the same time, many researchers and scientific institutions have need for such instruments.

Therefore, centers for collective use of unique and expensive instruments and facilities have begun to operate with the aim of increasing effectiveness in the utilization of scientific equipment and computer technology and also of improving the quality of scientific experiments in academies of sciences.

Thus, in the BSSR Academy of Sciences, centers have been created for automated spectroscopic measurements, x-ray structural analysis, and cryogenic research. The services of these centers are used by over 40 scientific and production organizations of the republic in addition to academy institutes.

Similar centers for interagency use have been created under the academies of sciences of Georgia, Moldavia, and Uzbekistan, and under the Institute of Deserts of the TuSSR Academy of Sciences. The LaSSR Academy of Sciences has developed a computer system that permits structural and programming unification of specialized computers into an integrated complex. This has provided the possibility for significant progress in the automation of experiments in scientific institutes of the academy and in wide use of computer technology by other republic organizations.

A center for activation analysis, created under the Institute of Nuclear Physics of the UzSSR Academy of Sciences, serves not only republic scientific and production organizations but is also an interrepublic center. In this connection, it seems

advisable to authorize the Coordination Council to prepare and, during the current year, to hold at one of the academies of sciences (for example, the Moldavian SSR Academy of Sciences) a special seminar of vice-presidents and chief scientist-secretaries of the union-republic academies of sciences to study the experience of organizing work at centers for collective use of scientific equipment and up-to-date equipment for automating experimentation. Such measures will permit the expansion and strengthening of creative relationships between the academies and scientific centers of the USSR Academy of Sciences and to exchange experience accumulated on this important subject.

#### Organization of Exhibits

It is necessary to note that the existing form of information support to production organizations concerning achievements of academies of sciences is not very effective. At the same time, acquainting the scientific-technical communities of economic ministries and agencies by means of academy institutions' conducting exhibits is insufficiently utilized in the republics. Exhibitions organized at Gosplan by the UkSSR Academy of Sciences, by the Siberian Department and Ural Scientific Center, and the Far East Scientific Center of the USSR Academy of Sciences, and also by the USSR Academy of Sciences as a whole have had extremely good results. It seems advisable to conduct regular exhibits in republics and regions and, on results that are most significant for the economy, in Moscow. The scientific council on exhibits of the USSR Academy of Sciences and union-republic academies of sciences and the Coordination Council should study organizational forms for these exhibits.

#### Effectiveness of Scientific Research

Scientific institutions of the republic academies, utilizing direct program agreements concluded with economic ministries and large production associations, have achieved important results both in fundamental research and in the development of applied scientific-technical problems. These achievements are being widely applied in the economy.

The union of the forces of academy science and science of the economic sectors and the isolation of leading trends permit, as a rule, the acceleration of research and an increase in its success rate.

Thus, during the years of the 10th Five-Year Plan, the economic effect from introducing the results of scientific developments, according to data from the academies of sciences, was as follows: the UkSSR Academy of Sciences, over 1.5 billion rubles; the LaSSR Academy of Sciences, over 450 million rubles; the UzSSR Academy of Sciences, about 900 million rubles; the BSSR Academy of Sciences, about 350 million rubles; and the MSSR Academy of Sciences, over 100 million rubles. These data somewhat exceed the indicators achieved by the named academies during the 9th Five-Year Plan. Significant successes in introducing the results of scientific research into the economy were achieved by the academies of sciences of Kazakhstan, Azerbaijan, Lithuania, Estonia, and other republics.

The experience of the UkSSR Academy of Sciences is important; this academy, with aid from the Ukrainian Communist Party obkoms did significant work in strengthening

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interagency scientific-technical relationships in regions. For example, the Western Scientific Center of the UkSSR Academy of Sciences, with active support from the L'vov obkom of the Ukrainian Communist Party, created a kind of system for managing special-purpose scientific-technical programs that provide for increased effectiveness of work of leading economic sectors of the region. Just during the last five-year plan, the scientific institutions of the center introduced over 340 scientific developments with an economic effect of about 105 million rubles. The experience in the work of the Western Scientific Center of the UkSSR Academy of Sciences and the L'vov obkom of the Ukrainian Communist Party was discussed at a meeting of the presidium of the USSR Academy of Sciences and at a special conference-seminar conducted in January 1981 in L'vov. Without a doubt, there are examples of extremely fruitful joint projects at individual scientific centers and oblast party organizations in the RSFSR. They also should be studied and utilized by all academies of sciences in their practical activities.

## Conclusion

The 26th CPSU Congress placed large tasks before Soviet science. It is necessary to provide for record development of fundamental sciences and increase the success rate of applied research. The breadth and significance of the planned research program require energetic utilization of the strengths and reserves of science itself. And these reserves are significant. Far from all scientific collectives work at full output and, in a number of them, there are still petty topics and duplication.

The documents of the congress note the necessity for improving the organization of the whole system of scientific research. It should be significantly more flexible and mobile, intolerant of nonproductive laboratories and institutes.

In connection with what has been presented, it seems advisable to authorize the union-republic academies of sciences to prepare during 1982 and present to the presidium of the USSR Academy of Sciences and the USSR State Committee for Science and Technology a proposal for improving the organization of the whole system of scientific research in the republics and also a proposal for necessary regrouping of scientific forces to correspond to the decisions of the 26th CPSU Congress.

To be sure, such work by an academy of sciences should be agreed upon by the directive bodies of the republic.

"Today, looking ahead for five or ten years," said L. I. Brezhnev at the 26th CPSU Congress, "we cannot forget that it is during these very years that the economic structure will evolve and be created with which the country will enter the 21st Century. It should embody the basic features and ideals of the new society, be the avant-garde of progress, and personify the integration of science and production, the unbreakable union of creative thought and creative labor."

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CENTRAL ASIAN AND KAZAKH ACADEMIES OF SCIENCES COORDINATE RESEARCH

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 12, Dec 81 pp 26-31

[Report by Academician A. S. Sadykov, president of the Uzbek SSR Academy of Sciences: "The Experience in Joint Research Projects by the Academies of Sciences of Central Asia and Kazakhstan on Important Regional Scientific Problems and Prospects for Development of These Projects"]

[Text] In the "Basic Directions for the Economic and Social Development for 1981 to 1985 and for the Period up to 1990," which was approved at the 26th CPSU Congress, the task was posed of expanding the economic potential of the eastern regions, including the republics of Central Asia and Kazakhstan. By combining favorable climate conditions, large capabilities for agriculture, large fuel-energy and raw-material resources, and fast-growing labor resources. Central Asia and Kazakhstan are unique economic regions. They possess an enormous potential for expanding production and increasing the contribution to the creation of the supply and equipment base for communism. The task consists of further development of the region's power, gas and petroleum extraction, chemical industry, construction, nonferrous metallurgy, and other sectors important for the economy of our whole country.

To accomplish these tasks, the republics of the region possess a significant scientific potential. Over 250,000 people work here in the science sphere, including over 90,000 scientific and scientific-teaching workers. Just within the republic academies of sciences there are 110 scientific institutions in which there are over 600 doctors of sciences and 4200 candidates of sciences, and 395 active and corresponding members of the republic academies.

The Council of Presidents of the Academies of Sciences of Central Asia and Kazakhstan has established the goal of increasing the effectiveness of joint scientific research on problems that represent general interest. Appropriate republic academies have been designated head organizations for these problems: for the problem of the biological foundations for exploiting the mountain regions of Central Asian republics -- the Kirghiz SSR Academy of Sciences; for the problem of the complex study and exploitation of the desert regions of Central Asia and Kazakhstan-- the Turkmen SSR Academy of Sciences; for the problem of seismology and earthquake-resistant construction -- the Tajik SSR Academy of Sciences; for the problem of population and labor resources -- the Kirghiz SSR Academy of Sciences; for the



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problem of studying the environment and utilizing the plant resources of Central Asia and also complex geological, geophysical and geochemical study of the earth's crust and outer mantle in the Central Asian region -- the Uzbek SSR Academy of Sciences; and, finally, for the problem of soil science and soil improvement -- the Kazakh SSR Academy of Sciences.

The results, as well as plans for joint research, were discussed at meetings organized jointly with the Coordination Council and at periodic meetings of the republic-academy presidents held in the capitals of the respective republics.

In the field of geology, the scientific institutions of Uzbekistan, Tajikistan, Kirghizia, and Kazakhstan have conducted research on the development of a unified chart of magmatic complexes for all of Central Asia and on the regional stratigraphy of Central Asia. Projects have been coordinated on the composition of a unified metallogenic map and on the study of the tectonics of Central Asia and Kazakhstan, with first priority on the tectonics of the Tyan'-Shan' and the Pamirs.

Special attention is being given to fundamental problems of forecasting strong earthquakes. A regional center for earthquake forecasting, created through the efforts of the scientists of the brother republics, is functioning. It publishes a yearbook on earthquakes in Central Asia and Kazakhstan.

In the fields of seismology and earthquake-resistant construction, we must note, first of all, the joint projects for searching for advanced signs of earthquakes, for seismic microregionalization, for creating test areas and networks of engineering-seismometry stations, and for exchange of information. The borders of test areas were refined; basic observation equipment was emplaced in zones of potentially strong seismic centers. This research was actively supported by the Section on Central Asia and Kazakhstan of the Interagency Council on Seismology and Earthquake Resistant Construction under the presidium of the USSR Academy of Sciences.

Within the framework of projects on the exploitation of mountain regions of the Central Asian republics, work has been done on geobotanical mapping of mountain vegetation and forecasting of pasture yields; the possibilities have been studied for increasing feed resources by means of irrigation, introduction of fertilizers, and land reclamation; and projects have been undertaken on using mountain and foothill regions for naturally irrigated gardens and vineyards and on the preservation and reproduction of rare types of animal life.

In part, we have utilized results from analogous work on the exploitation of mountain regions done in the Caucasus, the Crimea, and the Carpathians; however, relations with scientific institutions of republics that are utilizing mountain regions, it seems to us, need to be strengthened.

The time has come also to strengthen relations between the republic academies of sciences of Central Asia and Kazakhstan, on the one hand, the Siberian Department of the USSR Academy of Sciences, the Ural Scientific Center and other scientific centers of our country, the academies of sciences of other republics and, first of all, the USSR Academy of Sciences, on the other hand.

Widespread interest has been aroused by research on desert exploitation by the Turkmen SSR Academy of Sciences. Since 1967, the all-union journal "Problems of

"Desert Exploitation" has been published. Economic-production methods for radical improvement of desert pastures and for control and afforestation of shifting sands have been developed and introduced. Some all-union conferences have been held, at which results have been generalized and tasks have been determined for complex research for evaluating the natural potential of Central Asian deserts.

Working on this problem, in close cooperation, are the Institute of Deserts of the Turkmen SSR Academy of Sciences, the botanical institutes of the Central Asian republics and Kazakhstan, and the Institute of Geography and the Main Botanical Garden of the USSR Academy of Sciences, the All-Union Scientific-Research Institute of Astrakhan Sheep Herding in Samarkand, and other scientific institutions.

Cooperation has been maintained in a number of areas of scientific-technical progress in cotton growing. Over 40 scientific-research institutes, VUZ's, and scientific institutions of the USSR Academy of Sciences, the All-Union Academy of Agricultural Sciences, the Ministry of Higher and Secondary Specialized Education, and the academies of sciences of Central Asian republics cooperate on problems in fighting cotton-plant verticillate and fusarium wilt. This work is coordinated by the Coordination Council on Cotton Wilt of the Uzbek SSR Academy of Sciences, the All-Union Academy of Agricultural Sciences, and the USSR Ministry of Agriculture.

Work has begun on optimizing the economic cotton complex. This complex also includes: industrial sectors that supply means of production to cotton growing; water management; and sectors in industrial processing of cotton. The Institute of Economics of the UzSSR Academy of Sciences together with the Central Mathematical-Economics Institute of the USSR Academy of Sciences has created the methodological foundation for the development and determination of implementation conditions of the complex program "Cotton," which was recalled by V. A. Kotelnikov in his report. The results of this work were approved by the second all-union conference on the problem (Tashkent, 1979).

In joint developments, a large amount of attention is allotted to research on water problems. On an all-union, interrepublic basis, research is being conducted on the ecological, economic, social problems of shifting parts of the flow of Siberian rivers, irrigation and land reclamation in Central Asia and Kazakhstan, and problems of the Aral Sea. An important contribution to verifying the advisability and necessity for accelerating the shifting of Siberian waters to Central Asia and Kazakhstan was made by the scientific conference conducted in April 1978 in Tashkent, the coordination meeting in September 1978 in Alma-Ata, and a joint session of the Permanent Commission for the Study of the Natural Productive Forces of the USSR under the USSR Academy of Sciences, KaSSR Gosplan, and KaSSR Academy of Sciences in May 1979 in Alma Ata. Participating in them were the presidents of the academies of sciences of the republics of Central Asia and Kazakhstan, institutes of water problems and geography of the USSR Academy of Sciences and the Siberian Department of the USSR Academy of Sciences, representatives of the State Committee for Science and Technology, and over 80 scientific-research, design, and planning organizations of ministries and agencies.

Significant changes in the Aral Sea caused by rapid fall in its level involve many branches of the economy and the conditions of life for the population of the Aral area. In developing ecological and social-economic measures for overcoming the

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negative consequences of the drying up of the Aral Sea and the desertification of the Aral area, there is participation by the academies of sciences of the Uzbek, Turkmen, and Kazakh SSR, the institutes of geography and water problems of the USSR Academy of Sciences, the Siberian Department of the USSR Academy of Sciences, all-union and Central Asian project-design organizations, and ministries and agencies. Results of research and a system of compensating measures were comprehensively discussed and approved at the visiting session of the UzSSR Academy of Sciences and at the scientific-production conference, both of which took place at Nukus in December of last year.

The four-volume fundamental work "The Irrigation of Uzbekistan" was the fruit of the scientific creativity of many scientists and specialists of Central Asian scientific institutions.

Special notice should be made of the useful scientific-organizational activity of the Central Asiatic Commission organized under the Scientific Council of the USSR Academy of Sciences on the Problem of the Distribution of Productive Forces, chaired by Academician N. N. Nekrasov.

The volume of joint work in the social sciences is large: on regional questions of socialist construction, on problems of mutual relationships among nationalities and of the formulation of a unified historical community -- the Soviet people, and on problems of uniting the achievements of the scientific-technical revolution with the advantages of socialist management; study is being done on regional peculiarities in manifestations of general patterns of expanded production on an intensive basis and other questions. A number of generalizing works have been prepared through collective efforts. Of course, social scientists still have much to work on in fulfilling the instructions of the 26th CPSU Congress to deepen the coordination of their activities by expanding jointly fulfilled research.

Attention is deserved by the work of the Uzbek SSR on the development of a unified coordination plan for economic research, which includes a clear determination of the character of economic institutes and VUZ departments, the composition of a list of complex subjects being coordinated with designation of head performers and co-performers, and also planned regulation of the subject matter of doctors' and candidates' dissertations.

The 26th CPSU Congress required still more subordination of the development of science and technology to the solution of the most important economic tasks of the country at the stage of developed socialism, wider application of the program method, providing for the interaction of natural, technical, and social-economic sciences in the development and implementation of complex problems in the development of Soviet society, the improvement of forms and methods of relationships between science and production, acceleration of introduction and increase in the effectiveness of completed scientific-research and experimental-design work, guided by the criteria of their urgency and effectiveness.

Under the 11th Five-Year Plan, more urgency must be given to the development of the cotton and food complex, water management problems, effective use of fuel-energy and mineral and raw material resources in production, the formation and development of regional-production complexes, especially on newly exploited land, improvement

in methods and forms of planning and management of the economic and social development of the region, and environmental protection. The foundation of the economy of the Central Asian economic region has been and remains the cotton agroindustrial complex, in the development of which all republics of Central Asia and Kazakhstan are interested. The efforts of only one republic are insufficient for its optimization or for balanced and dynamic development of all its sectors on the basis of scientific-technical progress. The accomplishment of this task requires the utilization of the potential of the region and of the country as a whole. Without this, it is not possible to avoid disproportions fraught with large economic losses.

A large array of tasks must be accomplished in the fields of genetics, selection, radical improvement in the agrotechnical system, chemicalization, mechanization, distribution of biological methods of fighting plant pests and diseases, in the development of methods for complex cotton processing and solution of other problems of scientific-technical progress, and in the intensification and increased effectiveness of cotton growing.

The necessity has arisen for the re-tooling of the industrial sectors related to cotton growing: cotton-gin and machine-building industry, mineral fertilizer industry, and others. In all these areas, a large amount of scientific-research and project-planning work is being conducted, but it is uncoordinated. Its effectiveness must be significantly improved by uniting scientific forces within the framework of a unified program and plan and a body must be created for centralized management of the implementation of the "Cotton" program and the food program.

It must be remembered that the material basis for agriculture and for the whole economy of the republic is irrigated farming; however, its development is retarded by a growing shortage of water resources. Thus, even with full and more effective utilization of the whole water supply of the Aral Sea basin, no more than 15 to 20 percent of the total area of arable land in the republic will be irrigated. The water management problem is acquiring exceptional urgency. It is necessary to search for additional sources of water resources and means for their economical utilization. Forthcoming fuller involvement of new lands in economic circulation requires the creation of new irrigation canals to regulate the flow of rivers, the introduction of more progressive technology and methods for utilizing irrigation water, including underground water, and serious reconstruction of existing irrigation systems. The successful implementation of all this is possible only on the basis of developing a unified, long-range, water-utilization plan for Central Asia and Kazakhstan, and drafting a unified plan for developing irrigation and introducing mutually coordinated complexes of measures for water distribution and improvement in the status of land reclamation. At the same time, as provided for by the 26th CPSU Congress, there must be an expansion of scientific-research and project-planning and preparatory work on the forthcoming initiation of construction of the canal for changing parts of the flow of Siberian rivers to Kazakhstan and Central Asia.

The republics of Central Asia and Kazakhstan have great opportunities to irrigate lands in desert zones for the needs of livestock raising on the basis of underground water utilization. The character and conditions of geological bedding are roughly the same in all Central Asian republics. However, their utilization is only at the beginning stage and joint efforts are necessary to solve complicated scientific-technical problems.

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The Central Asian economic region is a large fuel-energy base for our country. The basis for the fuel-energy complex of the region is natural gas. At the same time, energy resources are located very unevenly among the republics.

Under these conditions, to satisfy growing needs of the republics for energy and to provide a supply of natural gas to other regions of our country, joint research is necessary on the development and improvement of the fuel-energy complex on a regional scale with consideration for the possibilities of fuller utilization of solar and wind energy and for strengthening geological survey work and other measures.

The republics of Central Asia and Kazakhstan possess deposits of nonferrous metals, chemical raw materials, and certain other useful minerals. These deposits successfully complement one another and are matched with the region's high degree of availability of labor resources. The correct and fuller utilization of these favorable possibilities is a common economic problem for all of the republics.

It is apparent that scientific bases for special-purpose complex programs for exploitation of mineral and raw material resources must be developed with participation by Central Asian and all-union project-planning and scientific-research institutes and academies of sciences, especially the USSR Academy of Sciences. The purposeful, scientifically based investigation of completely new genetic types of natural concentrations of many elements or mineral paragenesis has great significance. It must rely, first of all, on deep theoretical geochemical research and on the study of the most promising areas of the region for the development of evaluative-survey recommendations for the investigation of various deposits.

Under the 11th Five-Year Plan, it is intended to continue and to expand the development of fundamental and applied-scientific problems in the study of the whole complex of geological problems of Central Asian republics. We hope for aid in this work from appropriate institutes and scientists of brother republics and, above all, from the scientists of Moscow and Leningrad and, of course, the USSR Academy of Sciences.

In accord with the instructions of the 26th CPSU Congress, the solution of scientific-technical and economic problems must be subordinated to the solution of social problems, to the improvement in the material welfare of the people, and to the comprehensive development of the personality. Under the regional conditions of Central Asia and Kazakhstan, the fuller and more effective utilization of the fast growing labor resources is a social problem that has great significance. This problem is not simple. It requires the theoretical study of population questions and specific conditions of the region, demographic forecasting, the analysis of employment status by sectors and regions, the creation of an appropriate number of jobs, the study of migration processes, the training of labor personnel in needed specializations, and many other measures.

Hence, the meeting of presidents of the academies of sciences of the Central Asian republics and Kazakhstan back in 1972 made the problems of population and labor resources one of the most important problems to be coordinated on the scale of the whole region.

The program for providing employment and the rational utilization of the labor force should be based on effective measures for accelerating the development of all sectors of the economy, especially industry and the nonproductive spheres, on the formation and development of large agroindustrial complexes, new forms for the social organization of production, particularly the regional production complexes, industrial centers, and regions, for example, the South Tajik, the Lower Amu-Dar'ya, the Kashka-Dar'ya, Dzhizak, West-Turkmen, and North Kirghiz regions, and the economic and social development of middle-sized and small towns.

The scientific collectives of Central Asia and Kazakhstan, having united their forces, and with constant support and aid from the USSR Academy of Sciences and from other scientific institutions of our country, will successfully accomplish the tasks set forth by the 26th Congress of the Communist Party of the Soviet Union.

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LEGAL AUTHORITY ADVOCATED FOR ACADEMY OF SCIENCES AS LEADING COORDINATING BODY

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 11, Nov 81 pp 53-61

[Article by V. P. Rassokhin, candidate of juridical sciences: "The 26th CPSU Congress and the Legal Bases for a Unified System for Introducing Scientific Achievements into the Economy"]

[Text] The problem of introducing scientific-technical achievements into production has been with us for a long time; however, not only has it not left the agenda, but it has become a key question, without the resolution of which the future successful development of the whole economy is inconceivable.

"The decisive, most urgent sector today is the introduction of scientific discoveries and inventions," stressed Comrade L. I. Brezhnev in the Summary Report of the CPSU Central Committee to the 26th CPSU Congress. ". . . Everything must be eliminated that makes the introduction of new things difficult, slow, or unhealthy . . . The accomplishment of this task is not a simple matter, of course, and it requires a break with outdated habits and indicators. But it is completely necessary for the country, for the people, and for our future."

Evidence of the complexity and unhealthfulness of the problems relating to the introduction of new technology is the fact that, in practice, the real possibilities for influence by fundamental science on the development of production and on technical policy in the economic sectors are still far from sufficient.

L. I. Brezhnev, indicating the special role of science in our society, said at the 26th CPSU Congress: "Science must be the constant 'perturber of tranquility,' pointing out the sectors where stagnation and backwardness have been noted but where the current level of knowledge provides the possibility to move ahead more rapidly and more successfully. Careful thought must be given as to how to make this work an integral part of the management mechanism."

From these positions, certain basic legislative and state-organizational decisions are proposed which, in our opinion, could provide the basis for constructing a unified system for introducing scientific-technical achievements into production.

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There seems to be no need to demonstrate that the determination of the basic directions for the technical development of any economic sector cannot remain the prerogative of agency institutes and management bodies of that economic sector. This contradicts not only the sense of a unified state scientific-technical policy and the objective needs for integration among economic sectors for the sake of developing the economy, but also the interests of broad-scale introduction of fundamentally new scientific-technical achievements. The determination of the directions for technical development of production is also the policy of introducing new technology, and it should be based on solutions adopted under the general influence of "big science" at a much higher level -- above the economic sectors at the national level.

Documents of the 25th and 26th CPSU Congresses stressed the necessity /for strengthening the influence of the USSR Academy of Sciences/[in italics] as the coordinator of all scientific work in the country -- not only /at the level of scientific research but at the level of technical developments conducted by economic sectors/[in italics]. To embody this important slogan in a real state-organizational form, to create a unified system for introducing large scientific achievements, and to turn this system into an integral part of the mechanism for managing the economy mean precisely, it seems, finding the consistent solution to the most important problem of uniting the achievements of the scientific-technical revolution with the advantages of socialism.

How can we visualize a legal mechanism that could help really to increase the role of the USSR Academy of Sciences in conducting a state scientific-technical policy but, in doing this, would not "overflow" its "banks" with unending flow of coordination matters (from the examination of agency projects to "assembly line" participation by scientists in the work of an ever-growing number of various commissions)?

The USSR Academy of Sciences -- as the highest institution of scientists in the USSR -- has been called upon to provide a final evaluation of technical policy in the economic sectors (from the point of view of its appropriateness to the main, long-range trends in the development of present science and technology), and also to provide an evaluation of the activities of head institutes of ministries and agencies in this sphere and the scientific-technical level of production in economic sectors.

The academy today is providing its evaluation on these questions; however, its opinion has no obligatory or legal force and, therefore, does not lead to any real consequences. Therefore, it seems to us, that conditions must be created whereby the expert evaluation by the academy, as an act of the highest scientific authority, should become a /legal act/[in italics], involving the adoption by the USSR State Committee for Science and Technology [GKNT] and USSR Gosplan of planning and organizational decisions that are obligatory for ministries and their subordinate institutes, organizations, and enterprises.

In order to implement the appeals of the 25th and 26th CPSU Congresses to make the USSR Academy of Sciences the coordinator of all scientific work in the country and to increase the influence of "big science," as an integral part of the management mechanism, on the development of the economy, it should be legally entrusted with the authority of /the highest expert collective of the country/[in italics]. In this connection, it should be allotted the right to provide final expert evaluation



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of the technical areas, solutions, and projects not only of one or more sectors of the economy, but also those (as assigned by the government) of national significance.

It must be especially stressed that in a majority of cases (with the exception of direct orders by the government), the question should be one of right, and not obligation, for the USSR Academy of Sciences to provide evaluation of the levels of scientific-technical development of production in economic sectors. The reason for this is that the academy cannot serve as a usual expert body that, in this case, finds itself bound up in all kinds of procedures and also with assignments from various ministries and agencies. Authority as the highest expert body in the country, which could be entrusted to the Academy of Sciences, would mean only that evaluations on questions of technical development, passed by the general meeting or presidium of the USSR Academy of Sciences, would acquire legal force.

Such legal status for the USSR Academy of Sciences would provide active influence by the academy on the conduct of a unified state policy without "adjustments" under pressure from agency interests. At the same time, it would prevent the academy from being burdened by extraneous functions and activities that would inevitably distract scientists from their immediate function -- the development of fundamental science problems. In this connection, it can scarcely be doubted that any question of principal importance to the technical progress of the country's economy can escape the attention of the USSR Academy of Sciences.

It should be noted that the right of the USSR Academy of Sciences to provide final expert evaluation would apply only to the sphere of engineering and technology development and to applied research and development conducted in the interests of production in the economic sectors and would not apply in any way to the determination of the development paths of science itself. Academy conclusions on questions of technical progress should be based on thorough generalization of world experience and on the latest achievements of science and technology. They can be refined to the extent that new knowledge and new discoveries appear. Of principal importance can be the position under which the right of the Academy of Sciences to provide final expert evaluation would become a legal norm: such evaluation could not be revised by the usual route of "apparatus"-agency agreement, "coordination," and compromise.

It is necessary to stress that even the introduction of a system of final expert evaluation by the Academy of Sciences of the technical level of economic-sector production and the direction of its development is not sufficient in itself to turn the problem of introducing science and technology into an original, permanent, integral part of the economic management mechanism. The USSR Academy of Sciences, as the highest expert body of the country, can possess only legally confirmed "authority with power" which, in the mechanism of state management, should be united with the authority of power.

To successfully accomplish the tasks posed by the 26th CPSU Congress for the introduction of scientific and technical achievements into the economy, it is completely necessary, in our opinion, significantly /to increase the power of USSR Gosplan and USSR GKNT/[in italics] and, in determining questions of unified policy, also /USSR Gosstroy and USSR State Committee for Standards/[in italics] (in relations with organizations, institutions, and enterprises in the economic sectors).

The general legal basis for imperative authority for these state committees as governmental bodies is laid down in the Law on the USSR Council of Ministers. The legislative allotment to the USSR Academy of Sciences of the status as the highest scientific-technical expert body of the country would not only create the legal organization of a scientific basis, but would become a key link in broadening the imperative functions of the state committees. The general aim of these measures is to overcome agency and economic-sector limitations in the approach to the most important task of introducing new technology.

With the creation of this system of rights and obligations, the next important step, in our opinion, should be principal changes in the /procedure for agreement by ministries and agencies on decisions adopted by the state committees/[in italics].

As practice has shown, agreement as a legal act (and not only as a means for comprehensive examination of a question and for taking various opinions into account) serves as the chief legal instrument in the hands of ministries and agencies for enforcing the priority of agency and economic-sector interests over those of the whole economy.

For example, with the confirmation by the GKNT of the state scientific-technical programs for the complex processing of bischofite (a complex mineral raw material for producing a wide variety of chemical substances) and for the extraction of titanium concentrates from viscous petroleum, the respective agency refused to endorse these programs although they were approved as tasks of the state five-year plan for the 10th Five-Year Plan among the 200 most important programs on basic scientific-technical problems.

Therefore, it seems to us that a procedure must be established under which agreement with agency tasks provided for in decrees by Gosplan, GKNT, and other state committees does not need to be looked on as a legal act. The planned tasks established on the basis of state committee decrees should be indisputably obligatory for all ministries and agencies. Scientific-research institutes, design bureaus, and enterprises of economic sectors, aided by a special system of responsibility, should be brought into the role of an executor of imperative decisions made at the national level.

This redistribution of rights would not be at all inconceivable (although, from the point of view of "apparat" logic, the persistent introduction into the system of relations pertaining to the management of scientific-technical progress would inescapably lead to infringement of today's role of agency structure in the economy). In practice, there are several examples of legislative decisions, on the basis of which, in certain spheres of scientific-technical policy, basic rights were granted not to agency organizations and institutes, but to other institutions not suffering from economic-sector narrowmindedness (for example, to the Institute of Electrical Welding imeni Ye. O. Paton of the UkSSR Academy of Sciences and to the Institute of Catalysis of the Siberian Department of the USSR Academy of Sciences).

The new system for the distribution of rights, of course, will require fundamental /changes not only in the legal position, but the very concept of a "head institute"/[in italics].

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Once, Bertrand Russell sadly noted that the errors and weaknesses of something new are always more striking than the obvious absurdities that have become traditional. It goes without saying that it seems usual today for the position of the head institute in an economic sector to be that of the last stop on the road to scientific-technical progress. But this situation has not been characteristic of all those highly developed special sectors where the greatest successes were achieved during the period before and during the Great Patriotic War. It is not accidental, for example, that the aircraft industry, instead of a monopoly by one head institute, has had intense, really creative competition among design bureaus.

The monopoly position of a head institute, especially in the "civilian" production sectors is not simply the result of evolving traditions. The consolidation of monopoly by the head institute was one of the primary means on the part of the agency structure for securing its role as the absolute regulator of scientific-technical progress and also was one of the consequences of strict priority of the producer's over the user's interests. In the special sectors during wartime, there was no other choice but the wide range of real (sometimes dramatic), rather than formalistic and contrived, competition. This was also dictated by the enormous responsibility for developmental results and by the absolute priority of the client-user.

In the event that the monopoly of a head institute establishes itself under conditions where there is an absence of legal or any other means for real influence on the part of fundamental science, the appearance of such monopolism can become especially negative, if not repressive. Having allotted broad and absolute authority to head institutes, the law up to now has not established a real system of responsibility on the part of these institutes for the results of scientific-technical development within their economic sectors. Thus, the important truth has been forgotten, that the degree of authority should be adequate for the level of responsibility. This is a cornerstone both of management science and of jurisprudence.

There need be no doubt, to be specific, that it is just this kind of monopolism with the absence of real responsibility that was the basic reason for the 20-year delay in beginning the introduction of forechamber flare combustion in internal combustion carburetor engines. As explained at the general meeting of the Academy of Sciences in March 1981, this method, which was developed long ago at the Institute of Chemical Physics of the USSR Academy of Sciences, not only permits a 10 to 12 percent reduction in the use of gasoline, but also a sharp reduction in toxicity of exhaust gasses. However, only this year was the manufacture begun of the first Volga motor vehicles equipped with the forechamber flare combustion device. The same reason -- monopolism by head institutes accompanied by absence of a system of responsibility -- was one of the factors that has delayed until now the wide replacement in machine-building technology of metal cutting by plastic deformation and other non-waste technologies. The monopoly legal position of the Experimental Scientific Research Institute of Metal Cutting Machine Tools (ENIMS) in machine-tool building undoubtedly played a large role (along with many other factors) in raising the "production of shavings" in the country to more than 8 million tons a year. What is unnatural in this situation is not at all that the ENIMS scientific school was relentlessly attached to the ideas of metal cutting but, most of all, the monopoly influence of this institute on the unified policy in the development of technology for metal milling.

It is appropriate also to speak here about the real meaning of conservatism, which is often assumed to be the basic obstacle on the road to the introduction of scientific-technical achievements. "Normal" conservatism, not burdened by special agency interests, has a necessary, healthy, protective function: it prevents senseless expenditures by society on premature, scientifically unsubstantiated projects. In fact, the requirements for innovations should be higher and stricter than for engineering and technology already tested in production -- this is quite natural and justified. Conservatism is not a terrible thing in itself; it is a terrible thing when it is the monopoly position of the "conservative" and his special interest in proving his own conservatism.

Agency and economic-sector monopolism today has become one of the most serious problems awaiting solution in the sphere of scientific and technical progress.

There are two very important ways, in our view, to weaken the influence of monopolism by producer economic sectors on the development of science and technology.

First, /the isolation, within the structure of state science organization, of the fundamental sphere of engineering sciences and the creation of a "fourth system" of scientific institutions under the aegis of the GKNT/[in italics].

This, for example, could be done by organizing an Academy of Engineering Sciences by transferring from agency subordination to GKNT jurisdiction those institutes that were formerly under the Department of Engineering Sciences of the USSR Academy of Sciences and also those institutes whose scientific potential cannot be used in a complex and effective way within the framework of economic-sector agencies.\*

Such a solution would not only allow concentration of large forces on the main areas of technical progress, but would also create the basis for conduct by GKNT of a unified technical policy and for more objective solution of complicated problems.

Secondly, /strengthening as much as possible the rights and influence of head institutes in those cases where they express the interests of their economic sectors as a client and user/[in italics] Most often, the interests of an economic sector as a user coincides with the end interests of the economy as a whole.

An example of rational application of law in the conduct of scientific-technical policy is the already mentioned situation that evolved in the aircraft industry during the Great Patriotic War. Scientific policy here was determined by the Central Aero-Hydrodynamic Institute -- an institute of the fundamental type, which actually possessed the right of final expert evaluation. The interrelationships among the various developmental design bureaus was built on the basis of "the competition of results"; the fate of a development was decided by the user-clients of new aviation technology.

A large role in reducing the influence of agency and economic-sector monopolism, undoubtedly, could be played by allotting the USSR Academy of Sciences the right to make final expert evaluations on questions of technical progress.

\* For more details on the necessity for creating a "fourth system" of scientific institutions, see the author's articles in VESTNIK AN SSSR [Herald of the USSR Academy of Sciences] 1979, No. 11, and "EKO," 1980, No. 1. -- Ed.

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Agency bias (a phenomenon that deserves attention not only from lawyers, but most of all from sociologists, economists, and philosophers) is not limited strictly to economic-sector agencies. Even GKNT has had up to now to construct its work "especially according to economic-sector principles."\* Today, the sections of GKNT correspond to agencies of the economic sectors. And this often leads to a situation whereby, in its work, a section of GKNT puts the interests of the agency whose activities it should be directing -- above the national interests. One such case, relating to the fate of an important invention, was described by PRAVDA in the article "Bureaucratic Protection of the Old Homestead."\*\*

Proposals have already been made many times for the creation of special state bodies for special-purpose program management of research, development, and the introduction of the most important scientific-technical achievements. But the activities of GKNT itself should be constructed according to the special-purpose program principle and not according to economic sectors. Instead of sections corresponding to economic sectors (the inadequacy in the influence of which on the technical development of economic-sector production has already been laid down in the very principle of their formation and functioning), with the addition of just a section "for summary planning," there should be sections, in our opinion, that would direct all work on the fulfillment of national-level complex scientific-technical programs, would distribute resources, and exercise control over raising the technical level of interrelated production, independent of its economic-sector subordination. If a "fourth system" of scientific institutions were to be created, the GKNT would receive a powerful scientific base and an organizational system corresponding to its functional purpose.

In principle, the strengthening of the authority and the expansion of functions of GKNT would permit it to have real influence on the introduction of fundamentally new and other especially important scientific and technical achievements and to affect, specifically, the technical progress of production in individual economic sectors in the interests of the whole economy. And this, in turn, it appears, would require the creation of a system of GKNT bodies in the union republics.

Proposals have been made many times for the formation of republic committees for science and technology subordinate to union-republic councils of ministers. This solution, in our opinion, would run counter to the very essence of conducting a unified national-level policy for developing science and technology during the epoch of the scientific-technical revolution, to the concentration of effort on the decisive areas, and to the needs for rapid growth in scientific potential. It would be more advisable to create in the republics (and also in large regions of the country as, for example, in Siberia) departments or administrations of USSR GKNT. In form, such a unified system of bodies for national-level management of scientific-technical progress would be close to that of the organizational structure under which, for example, the USSR Procurator's Office functions.

The strengthening of the imperative function of USSR Gosplan and USSR GKNT, resting on the scientific basis of final expert evaluations done by the USSR Academy of

\* In this connection, see, for example, the article "Faktor vremeni" [Time Factor], TRUD, 1975, 1 February.

\*\* See PRAVDA, 1980, 11 February.

Sciences would be, in a natural form, related to the creation of /a system of responsibility on the part of economic-sector scientific-research institutes and design bureaus, and also associations and enterprises/[in italics].

With such changes in the management mechanism, when it would be oriented toward more rapid introduction of scientific-technical achievements into production, it would be advisable to give GKNT the following authority:

the right to transfer scientific and design organizations responsible for systematic nonfulfillment of national-level tasks temporarily (for a period of up to five years) to a lower category;

the right to suspend payment of bonuses to managers of enterprises and organizations failing to fulfill such tasks; and

the right to exact from enterprises or scientific-technical organizations (as fines according to a decision of the State Board of Arbitration) of estimated sums paid for work which, through their fault, has not been carried forward to the point of introduction into production. These sums then would be entered into a GKNT reserve fund.

And finally, one of the most basic positions is that GKNT itself should decide questions not only concerning the allotment of head-institute rights to economic-sector institutes (these rights should be effectively limited to the sphere of designated problems), but also concerning the redistribution of these rights (under conditions where the interests of user economic sectors are taken into primary consideration), and also concerning the deprivation of head institute status from any economic-sector institute.

There should be established also a clearly defined procedure for resolving differences between scientific research and design bureaus, on the one hand, and head institutes, on the other hand (for example, through GKNT scientific councils and commissions).

In creating a unified system for introducing scientific and technical achievements into production, it would be extremely important to introduce a special /economic and legal policy for obsolescent production/[in italics].

Such a measure is necessary because, employing just incentive measures for successful technical innovations, it is not possible, in our view, to move off dead center in solving all the very complicated and important problems in the introduction of new technology.

Long ago, the necessity arrived for introducing a system of responsibility that would operate constantly, automatically, and independent of the interests of bodies, enterprises, and organizations that it should be applied to.

What, in our opinion, should be included in a policy on "obsolescent production"?

First of all, there should be a well-developed "system of special taxes "on technical backwardness"/[in italics].

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The first attempt to introduce such a tax was the formal establishment (by a joint decree of USSR Gosplan and USSR GKNT, the State Committee on Prices, and the State Committee on Standards, of 23 September 1971) of discounts, deducted in the state budget, from the prices of products certified to be in the second category of quality. However, in reality, these discounts have never been applied since that time.

A decree of the CPSU Central Committee and USSR Council of Ministers adopted 12 July 1979 indicated that discounts from prices of products of the second quality category should become obligatory; definite procedures were even provided for. Such a tax is a legal expression of economic responsibility on the part of enterprises for the backwardness of the technical level of production.

In the future, discounts on prices of products in the second quality category should be supplemented by other types of taxes. Thus, gradually, an effective, noncompromising system of special taxes would be developed "for technical backwardness."

Apparently, the right to impose these taxes on obsolescent products and backward technology should be entrusted to financial bodies, which would be guided by the decisions not of economic-sector agencies, but of USSR GKNT or USSR State Committee for Standards. In accord with policies in decrees of the CPSU Central Committee and USSR Council of Ministers, the functions of these governmental bodies would also be strengthened in the field of control over the technical level of economic-sector production.

The establishment of a system of taxes on technical backwardness in the hands of GKNT and USSR State Committee for Standards would provide an extremely effective means for influencing enterprises and associations. In this case, financial bodies would have the capability, according to proposals by the state committees, to confiscate profits received by enterprises and associations on account of backward products or technology, and USSR Gosbank could introduce certain limits in financing obsolescent production.

Secondly, a very effective means for implementing policy on obsolescent production could be /the right of USSR Gosplan and USSR GKNT to exclude the volume of products ("sold" or "net") recognized as outdated, from indicators of total volume of plan fulfillment by enterprises (associations)/[in italics].

Thirdly, for certain special cases, the /introduction of exclusive authority for GKNT could be provided for/[in italics].

Quite common, for example, are the imperative functions of the Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision, which has the right through its own authority (in spite of prospects for frustrating planned indicators or of "objective reasons") to forbid use of any mechanism or equipment if its further operation threatens an accident. And there are situations, when very important scientific-technical achievements fully prepared for introduction into production are not applied for many years (even despite the fact that they would solve very urgent economic or ecological problems with unusual effectiveness), that cause losses no less important than do large accidents or natural calamities.

No less important is the question relating to environmental protection. And here it is sometimes necessary to give exclusive authority to state committees. One can scarcely hope that the interdictions of local sanitation inspectors will at some time have sufficient means to influence large enterprises and agencies that violate requirements for ecological cleanness; the "weight classes" of the parties here are really unequal. Practical power in this sphere for representation of sanitation supervising bodies could belong to USSR GKNT itself: pollution of the biosphere and technical backwardness are two sides of the same coin.

Therefore, in cases of gross violation of requirements for ecological cleanness because of the "nonintroduction" of scientific-technical achievements into production, and also in certain other exclusive cases (for example, cases of violations of basic scientific-technical programs) it would be advisable to give USSR GKNT rights analogous to the rights of the Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision, to put a stop to obsolescent production.

In these rather rare cases, a powerful system of responsibility that has evolved in our economic life -- the machinery of internal agency responsibility -- would begin to operate automatically and irrepressibly. Such a "push" would be sufficient for the system to begin to operate independently, with ever increasing acceleration and inevitable sweep, capturing an increasingly wider circle of workers -- from "apparat" managers to specific performers at enterprises.

All these measures, in our opinion, should lead to the gradual formation of a special legal regime for obsolescent production, one of the most important factors in transforming the contradiction between science and production into an internal contradiction of production itself.

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#### INTERNATIONAL EXCHANGE OF TECHNOLOGICAL KNOWLEDGE

Moscow MEZHDUNARODNYY OBMEN TEKHOLOGICHESKIMI ZNANIYAMI in Russian 1981 (signed to press 17 Jul 81) pp 2, 20-21, 23-24, 37-38, 46, 65-66, 80

[Annotation, excerpts and table of contents from book "International Exchange of Technological Knowledge", by Viloriy Anatol'yevich Ryabov, Izdatel'stvo "Mezhdunarodnyye otnosheniya", 25,000 copies, 80 pages]

[Excerpts] Examines the role of scientific-technical knowledge and production experience in international economic relations. Shows the function of knowledge in the work process in the fulfillment of work in the research-development-production-marketing cycle. The international exchange of knowledge; knowledge as a commodity; what "know-how" is; how much "know-how" costs; what it is necessary to do to sell it -- these are the basic questions dealt with in this book. Examples are given from international licensing practice and the practice of Soviet enterprises and organizations.

#### Patents in Capitalist Countries

The patent system of modern state-monopoly capitalism, under the conditions of the scientific-technical revolution, assumes a two-sided role.

On the one hand, it continues to stimulate the development of scientific-technical progress; on the other hand, it retards such progress. Monopolies, especially multinational corporations, widely exploiting patent rights, actively force competitors out of the international market, establish monopolistic high prices for patented products, and limit the production and output of new products by other companies (even the purchasers of licenses). They try to seize blocks of patents for the most important inventions, and they conclude agreements with one another, forming patent pools, where a majority of inventions in a particular sector of production are concentrated. The rights to these inventions are acquired by all pool participants through the issuance of mutual licenses. Other companies, who create new inventions in that sector have difficulty in standing up to the power of the monopolies participating in the patent pool; as a result, the utilization of new inventions created outside the pool is retarded.

The monopolies widely utilize patents to control the development of technology and to control the development of technology and to retard this development when it suits

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them. Some inventions that are disadvantageous for the monopolies are bought up and put on the "shelf." The monopolies not only do not use these inventions themselves, but prohibit others from using them. As a result, a number of innovations are either not utilized at all or are utilized only after a long delay.

At the same time, by retarding the use of new inventions, the obsolescence of inventions already sold is delayed.

These circumstances often force companies that are not among the larger monopolies that participate in patent pools not to patent new inventions, but to hold them in secret, as know-how, deriving benefit from the "secrecy" of inventions, technological knowledge, and experience.

In addition, the modern patent system of capitalism does not provide for the protection of all scientific-technical achievements. Not protected by patents, for example, are mathematical methods of engineering calculations, computer programs, management and efficiency measures, or the results of social-economic and technical-economic research necessary for planning industrial units and enterprises. Consequently, the holders of these achievements, to receive economic advantages over competitors, must keep these achievements in secret.

The regional limitation of patent rights forces the inventor or patent holder to have his invention patented in all the countries where he wants to have exclusive rights for his invention and to give him an advantage over competitors in its use. However, this requires certain financial outlays related to patenting and keeping patents in force. Moreover, the patenting of inventions, as a rule, is done at a stage when a technical solution is being created in the process of conducting scientific-research and experimental-design work. At this stage, it is still difficult to make a very clear forecast with respect to the countries where an invention could be used effectively during the period that the patent is in effect. Therefore, it could turn out that, in the future, in the process of using the invention in some countries, it would not have patent protection.

#### Industrial Espionage in Capitalist Countries

Companies have taken measures to protect their secrets and industrial security services have been created that are directed against industrial espionage. It is sufficient to say that this kind of measure was foreseen as early as the end of the 19th Century at the Krupp plants in Germany. However much espionage there is, not all secrets can be stolen. For example, how can the skill and experience of specialists be stolen? We have already said that the rapid assimilation of new products requires a complex of knowledge and experience that pertains to many aspects of development, industrial production, organization, management, utilization, and so forth. Is it possible that this whole complex can be stolen? And what guarantee is there that the process of manufacturing new products according to stolen documentation will proceed without problems? And if there are none, how much time and money will have to be spent in eliminating "blank spaces" in the design and technology and in correcting the unavoidable errors in organizing production? Will this not lead to the company's being late in coming on the market with new products or new merchandise? Which is better, then: to buy a license to

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produce these products, to receive the necessary technical documentation, consultation, and specialists' training, to assimilate production in a very short time, and to enter the market "officially," with new products, or to risk spending a lot of money on stolen secrets, without a guarantee of their completeness, authenticity, or quality, losing time in testing and revising, without confidence in rapid success, entering the market with secretly manufactured products with the risk of being exposed for stealing others' secrets and for "unfair competition"?

Protection of Inventors' Rights in Capitalist Countries

It must be especially stressed that there is a difference in principle between capitalist and socialist countries in the approach to the legal status and principles in the transfer of knowledge and experience, including that which pertains to know-how. In capitalist countries, specialists' knowledge and experience, like their inventions, are taken over by companies. When hiring a specialist, a company concludes an agreement with him, transferring to the company all rights to future inventions created while working for the company. Specialists are also obligated not to divulge or publish, without the permission of the company, any information on scientific-technical achievements, developments, technology, the production process, and so forth, which the specialist creates or about which he has knowledge because of his work for the company.

Bourgeois legislation supports the effective protection of the interests of capitalists and entrepreneurs by providing for strict responsibility (including criminal liability) on the part of specialists and employees of companies for divulging company secrets.

The control by companies over the publications of their specialists leads to the emasculation of valuable scientific-technical information, turning them to a large degree into advertising publications.

In fairness, any specialist can easily be convinced of this statement if he analyzes the publications of foreign companies with the purpose of gaining information on the details of a new design or technological process. The exchange of scientific-technical achievements, inventions, scientific-technical documentation, production experience, and so forth, between companies in one country with companies in other countries is accomplished, as a rule, on a commercial basis through licensing agreements or contracts. The cementing basis for these agreements are patent rights to inventions, industrial models, trade marks, and so forth. The exchange of patent rights and know-how, even between mother and daughter companies, is accomplished on the same commercial basis.

International S&T Agreements

Agreements were signed for scientific-technical cooperation between Soviet organizations and 68 American companies, including such well-known companies as General Electric, Coca-Cola, and Occidental Petroleum. Recently, the American administration has taken the course of "freezing" these relations, although the companies themselves and representatives of business circles are in favor of developing normal

trade and scientific-technical relations with the USSR, seeing in this a mutual benefit both on a business plane and on the plane of relaxing the international tensions caused by the actions of American authorities.

In the case of joint scientific research and development, the agreements specify the legal questions relating to the protection and utilization of joint inventions and the scientific-technical knowledge and experience transmitted, and they specify the share of each participant in a development in the event of the sale of a license for joint results and other questions.

#### Protection of USSR Patents Abroad

The decisions of the 24th, 25th, and 26th CPSU Congresses gave attention to the future development of inventions and patent-licensing business in this country and the new USSR Constitution strengthened the rights of inventors and the obligations of enterprises and organizations to give them aid in the creation and utilization of inventions. A new holiday -- Inventors' Day -- was introduced.

All this indicates the large amount of concern on the part of the CPSU for the constant development of inventions, rationalization, and patent-licensing business in this country and for increase in their effectiveness.

As the data introduced above convincingly indicate, our country has had certain successes in the field of invention. At the same time, invention and patent-licensing work is not found to be at a high level at all enterprises and organizations. This particularly pertains to licensing work and to patenting of inventions abroad. Many scientists and specialists have still not overcome the psychological barrier that consists of the contradiction between the objective law of development of a wide exchange of achievements and advanced experience among specialists, enterprises, and organizations under the conditions of building the communist society, on the one hand, and the necessity of protecting their scientific-technical achievements by protective documents in the USSR and abroad, to "squeeze down" the size of publications about these achievements, removing from them the valuable know-how in the form of details of the technological conditions, designs, "plant" methodologies of engineering plans, and so forth, so as not to allow gratuitous utilization of these achievements by foreign companies, on the other hand. For it is quite well known that foreign companies attentively follow our scientific and technical achievements and advanced production experience.

Thus, the American political observer, G. Ransom, has stated that the United States widely utilizes the open information on the achievements of USSR science and technology that appears in publications. According to an estimate by the American intelligence authority, W. McGovern, in the process of preparing strategic decisions, about 20 percent of the basic information comes from secret sources and about 80 percent comes from open, legal sources.

According to evidence from the American press, in industrial espionage, the collection and analysis of published materials has first place. Then come: the analyses of exhibition entries and prospectuses of competing companies; study of products; utilization of data received in conversations with a competitor's employees;

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questions and "pumping" of information at scientific-technical conferences; false negotiations relating to purchase of licenses; theft of blueprints, models, and documentation; and so forth.

All this should be taken into consideration by Soviet specialists, for they have only to overlook protection and to provide superfluous information to the press -- and instantly it is utilized by foreign companies, skillfully applying "gentlemanly" collection with the techniques of industrial espionage. In these cases, patent protection and confidentiality of know-how have decisive significance.

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